

Tulsa Tornado Tribune

Where People Who Know the Weather Get Their Weather



National Weather Service Tulsa, Oklahoma

Spring 2011

Craig Sullivan - Editor

RECORD SETTING MONTH



Photo courtesy of Von Castor and Fox23 Tulsa

Aftermath of February 9 Record Snowfall near Jay, OK

Even in a part of the world accustomed to weather extremes, February of 2011 will likely go in the books as one of the wildest rides in memory. The record books took a serious beating, with two historic snowfalls in a ten day span, a new record low for the state of Oklahoma, an amazing warm-up, and even a tornado to close out the month. And in spite of it all, drought continued to plague much of the region. These events are summarized on pages 4-8.

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Deadly New Year's Eve Twister

Early Morning EF-3 Tornado kills 4, injures several others in Cincinnati, Arkansas.

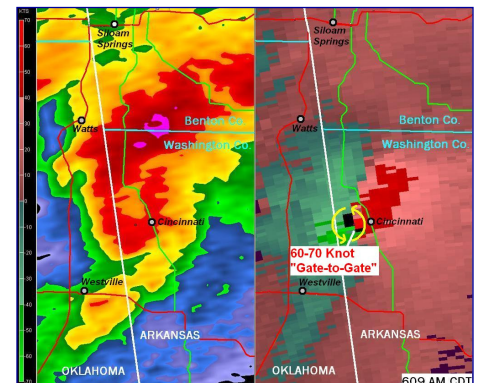
The year 2010 ended with an early (very late?) taste of spring which unfortunately, turned deadly. Severe thunderstorms on the evening of December 30 through the morning of December 31 produced hail, wind damage and at least two tornadoes in eastern Oklahoma and northwest Arkansas.

A band of strong to severe thunderstorms developed in the early morning of December 31st, near a Pacific cold front moving across eastern Oklahoma. While instability was limited, impressive deep-layer shear resulted in the formation of embedded supercell thunderstorms. One such storm rapidly developed strong low-level rotation over central Adair



Left: The Cincinnati Volunteer Fire Department building was destroyed in the tornado New Year's Eve. The total destruction of a metal frame building such as this indicates wind speeds of 140 mph, and an EF-3 rating on the Enhanced Fujita Scale.

Right: Radar reflectivity (left) and storm-relative velocity (right) from the Fort Smith radar as the storm approached Cincinnati shows a strong mesocyclone, indicated by about 70 knots of rotational velocity.



Twister Continues on page 8

From Severe Drought...to Record Floods



Left: Home swept off its foundation by flood waters (foreground), with another shifted off its foundation (background) at Fiddlers Bend on the Illinois River.



Right: Dashed yellow line shows the approximate high water line from the April 2011 floods at Fiddlers Bend on the Illinois River.

Although some parts of the area saw record snowfall this winter, the longer term precipitation picture was largely characterized by a lack of moisture from late fall through early spring. As a result, drought conditions continued to worsen through the early spring across portions of east Central and southeast Oklahoma as well as west central Arkansas. That is, until a significant change in the weather pattern occurred the last half of April, resulting in several

rounds of severe weather and heavy rainfall. A series of upper-level disturbances interacted with a nearly stationary frontal boundary, leading to multiple rounds heavy rainfall over the same areas for several days.

The good news: drought conditions are no longer in place for most of the area (see related story). The bad news: rainfall got completely out of hand by Easter weekend, particularly from near the Interstate 40 corridor

in eastern Oklahoma through most of northwest Arkansas. By Easter Sunday, the once drought-stricken area had become saturated and widespread flash flooding occurred. Storms that continued for the next few days only exacerbated the flash flooding problem.

When all was said and done, widespread rainfall totals of 6 to 12

Floods Continues on page 3

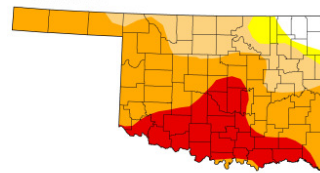
By early April, extreme drought conditions existed across Choctaw and southern Pushmataha counties, while severe drought conditions were noted southwest of a Pawhuska, OK to Fort Smith, AR line. For the 30 day period ending April 5, rainfall totals were less than 10 percent of normal. Since the beginning of the water year on October 1, 2010, eastern Oklahoma and northwest Arkansas had received only 25 to 75 percent of normal precipitation for this period, with the biggest deficits over southeast Oklahoma.

According to the Oklahoma Climatological Survey, for the water year through April 6, northeast Oklahoma saw its sixth driest such period, east central Oklahoma saw its fourth driest, while southeast Oklahoma saw its second driest. Soil moisture was severely depleted in much of the region, with deficits of about 2.5 to 6 inches across most of eastern Oklahoma and northwest Arkansas, again with largest deficits over southeast Oklahoma.

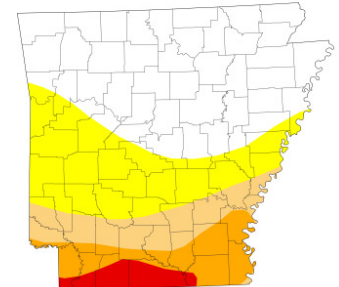
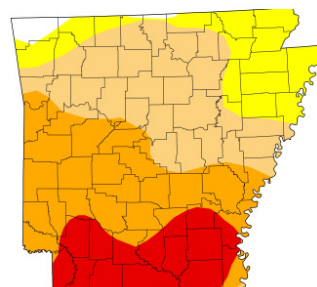
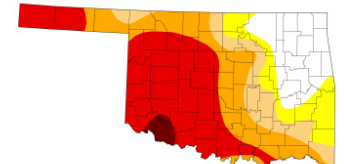
The seasonal drought outlook (through June) at that point was less than optimistic, indicating persistence for most of the affected area. But things have a habit of changing quickly in these parts, and true to form, the skies opened up and by the end of April, drought conditions were all but eliminated from northeast Oklahoma and northwest Arkansas. Only Choctaw and southern Pushmataha counties were considered to be in D2, or severe drought, while moderate drought conditions held on in some areas west of U.S. Highway 75.

U.S. Drought Monitor

April 5, 2011
Valid 7 a.m. EST



April 26, 2011
Valid 7 a.m. EST



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

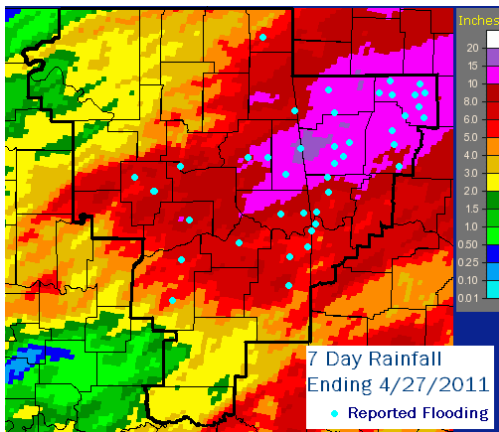
<http://drought.unl.edu/dm>



A comparison of the extent of drought conditions across Oklahoma and Arkansas from early to late April, 2011.

Floods

(Continued from page 2)



inches affected east central Oklahoma and northwest Arkansas during the 5 day period ending at 11am CDT April 27, 2011. Portions of Adair County in Oklahoma and Washington and Benton Counties in Arkansas received as much as 14 inches of rainfall during this same time. A citizen in Beaver, AR reported 17.7 inches of rain through a local TV station.

The results of all this rain were devastating across far northeast Oklahoma and much of northwest Arkansas. Numerous roads were closed for several days, and many high water rescues were performed. Sadly, as is often the case with an event of this magnitude, five people in northwest Arkansas lost their lives, all as a result of driving into flooded roadways. Two were killed in Bentonville, AR when the driver went around a barricade on Opal Rd and the vehicle was swept about 300 yards downstream into a creek bed. Another woman attempted to cross a flooded section of Arkansas State Highway 265 between Hubbard and Onda Mountain Roads in southern Washington County, about 3 miles southwest of Hogeey. She got out of her vehicle after it stalled and was swept away; her 11 year old son survived. Two

other fatalities occurred when an elderly couple was swept off of Arkansas State Highway 23 south of Witter in Madison County.

Considerable flooding was reported in and around the Fayetteville area, with water in many homes on the southeast side of the city. The University of Arkansas was forced to close for a time on April 25 due to significant flooding on the campus. There were also several families rescued from their homes in Siloam Springs due to the high water. Many of the area's State Parks were also closed and a number of districts were forced to close school.



Hydrographs from the Illinois River near Watts, OK, and the Baron Fork River at Eldon, OK, both of which established new floods of record.

Previous record for the Illinois near Watts occurred in July, 1960, while the Baron Fork at Eldon was in June, 2000.

Turn Around...Don't Drown!

Once again, tragically, a flood event has proven deadly as motorists attempt to drive across flooded roads. So, it bears repeating...

NEVER ATTEMPT TO CROSS FLOODED ROADS!

Why are flood waters so dangerous to drive through? It's a simple matter of Physics... something called buoyancy. The same principle that allows a 97,000 ton aircraft carrier to float works for a car too.

How does it happen? For each foot of water that rises up its side, an average vehicle displaces 1,500 pounds of water; in effect this makes the vehicle weigh 1,500 pounds less! Based on this, a depth of about 2 feet will carry away most automobiles.

What about trucks and SUV's? They should fare better because of their size and higher clearance, right? Not really... with their heavier weight, they displace even more water. For example, a full-size crew cab pickup weighing 5,000 pounds actually displaces about 6,700 pounds of water for each foot! Also, the larger tires typically found on these vehicles add to their buoyancy.

Another thing to remember...flood waters conceal the road's condition. It may well be washed out underneath what appears to be a few inches of water. Simply put...it's not worth the risk!

The floods did not stop with the smaller tributaries, as the swollen creeks emptied into the Illinois River basin in northeast Oklahoma and the Kings River basin in northwest Arkansas. Record stages were recorded at the Illinois River near Watts, OK and the Baron Fork River at Eldon, OK, while both the Kings River near Berryville, AR and the Illinois River near Tahlequah, OK exceeded major flood stage.

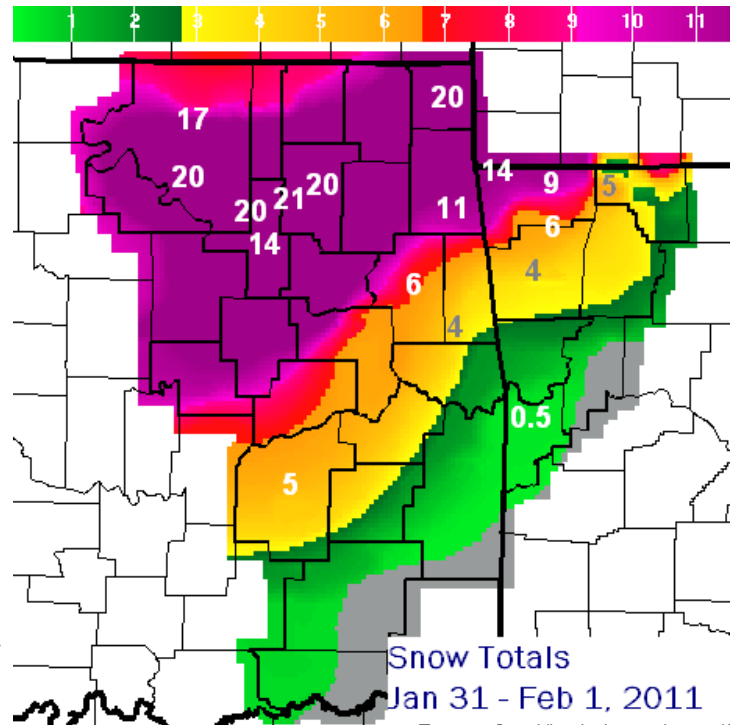
Round One: Record Snow for Tulsa

February kicked off with a significant winter storm affecting eastern Oklahoma and northwest Arkansas. The combination of a deepening upper-level storm system moving across the southern United States, and cold arctic air spilling south into the area resulted in a major winter storm that impacted a wide area. Areas of precipitation developed over eastern Oklahoma on the evening of January 31, mainly in the form of freezing rain or sleet initially, with embedded thunderstorms during the night. As the cold air continued to spill south, a quick change to snow occurred across much of northeast Oklahoma during the night and early morning of February 1. The snow continued, heavy at times, into the afternoon, before finally tapering off by sunset. At the same time, a surface low intensified as it moved from Texas northeast into eastern Arkansas during the day, resulting in strong northerly winds and blizzard to near blizzard conditions at times.



A view outside the National Weather Service office in Tulsa, where even the snow plows were having a tough time with the conditions early on the morning of February 1. Photo by Steve Piltz.

Across much of southeast Oklahoma and northwest Arkansas, freezing rain and sleet persisted for a longer period of time, leading to greater amounts of ice and sleet, with less accumulation of snow. Ice accumulations were generally less than a 0.25", but sleet piled up an inch or two in some places. The freezing rain and sleet ultimately changed to snow, with amounts ranging from one to five inches. The far northwest corner of Arkansas saw a quicker change to snow, and thus, saw heavier snow amounts.



When it was all over, total snowfall amounts of 10 to 15 inches were common across northeast OK, with an area of 18 to 21 inch accumulations along and north of Highway 412 and Interstate 44 in northeast Oklahoma. Snow drifts of 3 to 5 feet were also common. Tulsa officially recorded 14.0 inches of snow with this storm, breaking the record for the heaviest snowfall from a single storm, previously set in March, 1994.

Top 5 Tulsa Snowstorms

(Two day totals)

- 1) 14.0" Jan 31 - Feb 1, 2011
- 2) 12.9" Mar 8-9, 1994
- 3) 11.5" Mar 20, 1924
- 4) 11.5" Jan 8-9, 1920
- 5) 10.7" Nov 30 - Dec 1, 2006

Photo: The historic snow measurement at WFO Tulsa 2/1/11



Hunkering Down

Chuck Hodges and Bruce Sherbon, forecasters at the National Weather Service Forecast Office in Tulsa, OK, planned to arrive early for their scheduled shifts on Tuesday, February 1—six to eight hours early. Anticipating what would be a winter storm of epic proportions, the intrepid forecasters knew they would be in for the long haul and decided to get to the office ahead of the storm and spend the night there before starting what would be a marathon session of double-shifts, few breaks, and lots of snow.

Sherbon, who had planned to get some sleep at home before going into the office, was awoken by thunder that accompanied the powerful snowstorm around 11:30 on Monday night. "I knew at that time it was pretty much 'go time,'" he said. "We had two or three inches of sleet on the ground at my house already and the roads were deteriorating rapidly."

After he arrived at the office and had a chance to look things over and watch the weather for a while, Sherbon "sacked out on the couch for a few hours." Around 5 a.m., he got up and started issuing Local Storm Reports—160 of them in all. "That didn't stop for 17 hours straight," he said with a chuckle. Breaks were minimal. "I would get up and get a Coke and get up and go to the bathroom, but that's it," he said. He did admit, though, that he found time to warm up and eat some of the extra food he brought in to sustain himself, including his favorite brand of microwave pizza.

Likewise, Hodges realized the day before that he needed to prepare early if he was going to make it in to work for his shift. "It became pretty obvious Monday afternoon that I wouldn't make it into work Tuesday morning for that 6:00 a.m. shift unless I just decided to come on in," he said. "I brought a sleeping bag, brought my pillow,

From the NWS News 2/10/2011
Story written by Sean Potter

brought a change of clothes, definitely brought a toothbrush—stuff like that—brought a little bit of food."

Although he arrived at the office around 10:00 p.m., he also found himself awoken by the same claps of thunder that stirred Sherbon from his slumber at home around midnight. "I can't say I really slept all that well," Hodges said. "I found myself the rest of the night probably waking up about every hour and checking out the window."



NWS Tulsa Meteorologist Chuck Hodges looks over data during the record snowstorm of Jan 31- Feb 1, 2011.

Photo by Steve Piltz.

After waking up around 5:00-5:30 a.m., Hodges began his shift at 6:00 and worked straight through until 10:00 p.m. At that point, he was able to get some sleep until around 2:00 a.m., finding refuge in an office chair. "The floor wasn't treating me all that well." When he awoke, he assisted in the operations area some more before helping shovel out cars with a colleague and making a path to the main road. Finally able to leave



NWS Tulsa Meteorologist Dave Jankowski ventured out in the elements to measure the snowfall each hour during the record-breaking snow.

Photo by Bruce Sherbon.

around 7:00-8:00 Wednesday morning, Hodges went home and "straight to bed," having spent nearly 36 hours at the forecast office.

Although it was not a real-time significant event, hydrologically-speaking, the Tulsa Weather Forecast Office was assisted by the staff of the collo-

cated NWS Arkansas Red-Basin River Forecast Center, where Bill Lawrence, acting hydrologist-in-charge, was also prepared. "I came Monday night with suitcase in hand, expecting to spend several nights here," he said. "The forecasts verified, and the storm was really bad. There was no way my car would be getting out of the parking lot Tuesday or even Wednesday for that matter." Lawrence, who lives in a rural area 30 miles from the office, said he was humbled by the numerous offers from coworkers to take a shower and sleep at their homes nearby. "Their kindness has been much appreciated!"

February 8-9 Snow...Re-writing the Record Books

Having barely recovered from the blizzard one week earlier, northeast Oklahoma bore the brunt of another major winter storm during the night of February 8 and the morning of February 9. This time the event began as snow and targeted much of northwest Arkansas as well. While this storm system was not necessarily as strong as the one the week before, a narrow corridor of strong forcing led to a narrow band of intense snowfall that remained nearly stationary for several hours, near a Ponca City, OK to Chelsea, OK to Fayetteville, AR line.



Photo courtesy of the City of Tulsa

Above: Spavinaw Lake Permit Office where the record 24-hour snowfall was measured.

Below: Jay, OK after 25 inch snowfall

measured a whopping 27 inches of snowfall from this event, the new Oklahoma state record for greatest 24-hour snowfall! This broke the previous record of 26

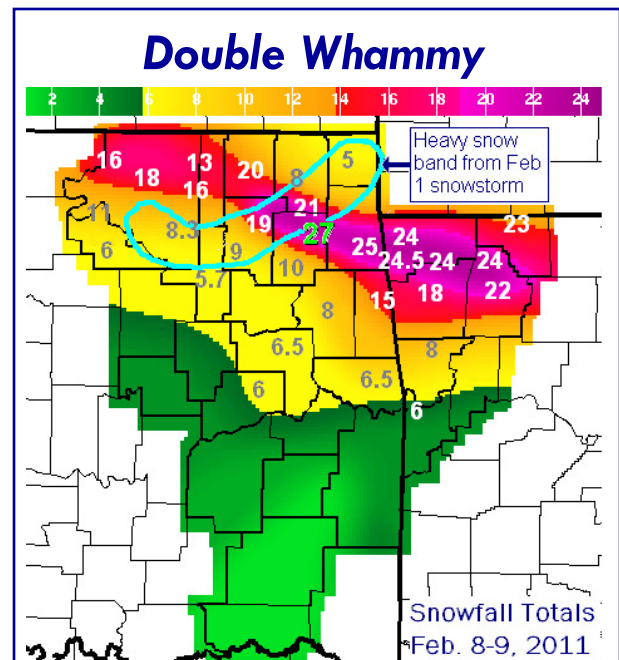


Photo courtesy of Von Castor and Fox23 Tulsa

inches set in Woodward, OK and Freedom, OK during the late-March 2009 blizzard, but still fell well short of the all-time state record for a single storm: 36 inches in Buffalo, OK in February, 1971. Outside of the intense snow band, snow amounts from 4 to 8 inches were widespread north of a McAlester, OK to Poteau, OK line, with 1 to 4 inch totals to the south. Some sleet also briefly fell as the precipitation began in far southeast OK. Some blowing and drifting of snow also occurred, but winds were not as strong as they were with the system the previous week as

the surface low was weaker and much farther south, and blizzard criteria were not met with this storm.

The incredible snow totals were, in large part, due to the extremely dry nature of the snowfall in the bitter cold air-mass. This type of snow is more reminiscent of that seen in the inter-mountain west, the stuff skiers dream of! In fact, the snow to water ratio was near 25:1 during this storm, as opposed to a more typical 7:1 seen in this part of the country. Liquid equivalent totals from this storm were estimated from around 0.25" to 0.75", with upwards of 1.5" within the heavy snowband. In a more typical scenario, this would have resulted in amounts closer to 2 to 6 inches with a swath of about 12 inches.



The heavy snow band from the February 1 storm, about 20 inches, is overlaid on the snow totals from February 8-9. The area where the two heavy bands intersect likely saw nearly 4 feet of snow (including another 2-3 inch snowfall on February 4) during the 10 day period from January 31 to February 9. The weight of the snow caused significant damage to several boat docks on the south end of Grand Lake.

Record Cold

As skies cleared in the wake of the February 1 winter storm, and arctic air settled over the areas, much below normal temperatures were noted by the morning of February 3. Overnight lows fell to well below 0°F in many places along with wind chill values of minus 20 to minus 30 degrees across northeast Oklahoma and northwest Arkansas. A low of minus 18 degrees was recorded at the Nowata, OK mesonet, the coldest reading in northeast Oklahoma since 1996. Tulsa also set a daily record low, with minus 6 degrees. Impressive enough, but things went from bad to worse only a week later!

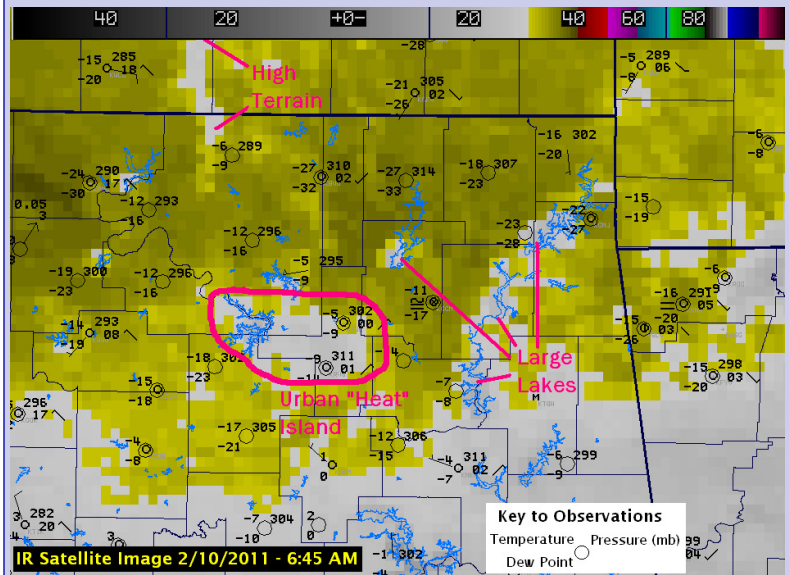
Record Lows set in February, 2011

	New	Previous	
<u>Tulsa</u>			
-1	2/2	0	1917
-6	2/9	-5	1996
-12	2/10	-3	1929
<u>McAlester</u>			
-4	2/10	10	1981
<u>Fayetteville</u>			
-5	2/3	0	1996
-18*	2/10	3	1981
-5 (tie)	2/11	-5	1981
* Monthly record			

The morning of February 10 would ultimately go down as one of the coldest nights this area has ever seen. Arctic high pressure built back into eastern Oklahoma and northwest Arkansas following the record-breaking snow storm of the 8th and 9th, which left deep snow covering much of the area. Clear skies and light winds

over the deep snow pack caused temperatures to plummet to record levels in many locations. Bartlesville, Oklahoma set their all-time record low with a reading of minus 28 degrees, which also broke the previous state record of minus 27 degrees. Tulsa, OK had a daily record low of minus 12 degrees (tied as 5th all-time coldest temperature); Fayetteville, AR set a daily record with a low of minus 18 degrees; and McAlester, OK set a daily record low with a reading of minus 4 degrees. However, most spectacular of all was the morning low of minus 31 degrees recorded by the Oklahoma Mesonet site in Nowata. This reading is now officially the new Oklahoma state record for coldest temperature! ❄️

Another Use for Infrared



Infrared (IR) satellite works by measuring the longwave radiation emitted from the Earth's atmosphere. Objects radiate away energy in proportion to how hot or cold they are: the warmer the object, the more intense the radiation it emits. By measuring how strong the longwave emissions are, we can infer the temperature at which they were emitted.

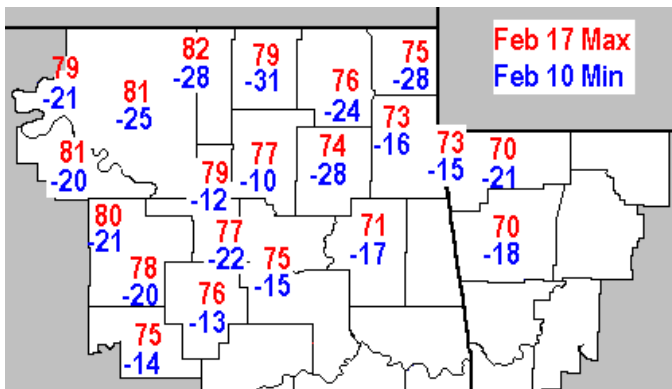
Often, cloud top temperatures are much colder than the earth's surface and appear much "brighter" than surrounding areas in the IR, not unlike the image above. But, February 10 was a clear morning, so what's with all the color in the image above? Well, the IR satellite is actually "measuring" the temperature at the ground! The surface temperature over northeast Oklahoma and northwest Arkansas is actually as cold as the cloud top temperatures often observed with storm systems...about 25 to 35 degrees below zero Celsius (minus 13 to minus 30 Fahrenheit). The surface observations plotted on the image correspond well with the satellite derived temperatures.

Also, some interesting features show up. Relatively "warm" (gray shading) pockets can be seen over many large lakes, much of the Tulsa metropolitan area, and the hilly terrain of northwest Osage County and southern Kansas.

This is seen frequently over the far northern states and Canada during the winter, but not so much in Oklahoma and Arkansas. Pretty cool - literally! ❄️

What a Change!

A major shift in the Jet Stream took place soon after the record snow and cold and resulted in more record-breaking weather. This time it was warm temperatures, and an all-timer of a 7 day temperature swing. By February 17, record warm temperatures were observed and several wildfires broke out in the warm and windy conditions. Temperatures made a 90°F -110°F swing in only one week at many locations after the record breaking cold temperatures and snowfall! The 7-day 110°F temperature change at the mesonet site in Nowata was the greatest such change within seven days in Oklahoma history.



February, 2011 - The Final Tally

All-Time Records

Oklahoma lowest temperature: minus 31° at Nowata Feb 10
Oklahoma 24-hour snowfall: 27 inches at Spavinaw Feb 8-9
Oklahoma 7-day temperature change: 110° at Nowata Feb 10th - 17th
Bartlesville lowest temperature: minus 28° Feb 10th
Tulsa seasonal snowfall: 26.1 inches
Tulsa snowfall for any calendar month: 22.5 inches
Tulsa 24-hour snowfall: 14.0 inches - Jan 31 - Feb 1

Monthly Records

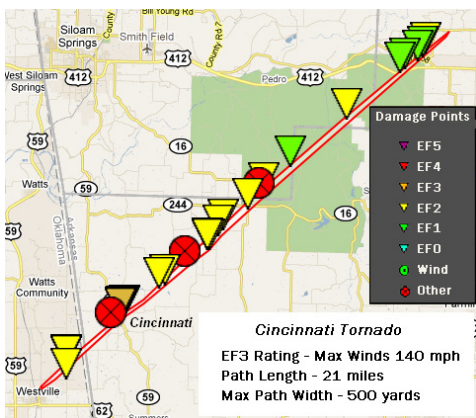
Fayetteville lowest temperature: minus 18° Feb 10th
Muskogee lowest temperature: minus 8° Feb 10th

Daily Records

Tulsa low max temperatures on the 2nd (19°), 9th (16°)
Tulsa high temperatures tied on the 17th (77°) and 19th (79°)
Tulsa high min temperatures on the 19th (56°) and 20th (64°)
Ft. Smith daily snowfall on the 4th (3.0") and 9th (5.3")
Ft. Smith high min temperature on the 18th (52°)
McAlester low max temperature on the 2nd (17°)
McAlester high temperature tied on the 17th (74°)
McAlester high min temperatures on the 16th - 20th (58°, 61°, 60°, 60°, 60°)
Fayetteville low max temperature on the 2nd (13°) and 4th (26°)
Fayetteville high min temperatures on the 16th - 20th (47°, 58°, 58°, 51°, 55°)

Twister

(Continued from page 1)



County shortly before 6:00 am. This supercell tracked quickly to the northeast, and ultimately spawned a strong tornado with a 21 mile damage path from near Westville, OK to just east of Tontitown, AR. An NWS Tulsa survey team determined that the tornado developed just northeast

of Westville, OK at about 6:05 am. The tornado tracked northeast, damaging a home, several large power poles, and large trees in eastern Adair County, OK.

The town of Cincinnati was struck by the twister at about 6:10 am. Several permanent structures and one mobile home were destroyed, and several other permanent homes were damaged within the approximately 300 yard wide damage swath. Two people were killed in the mobile home that was destroyed, and a third was killed either in or near a barn while he was tending to his cattle. At least 7 injuries also occurred. A woman in a mobile home northeast of Cincinnati when the tornado struck was transported to a hospital with serious injuries on the 31st, then passed away

due to those injuries on January 4. Debris from Cincinnati was reported as far away as Bentonville, Bella Vista, and Pea Ridge - some 20 to 30 miles to the north and northeast.

Moving quickly northeast, the tornado severely damaged several other permanent homes and destroyed at least six chicken houses and a number of outbuildings along its path through northwest Washington and far southeast Benton counties. Significant damage was reported near Wedington, and two more injuries occurred in a mobile home that was destroyed on Winwood Ranch Road southeast of Siloam Springs. A home on the far west side of Tontitown was destroyed, shortly before the tornado dissipated 3 miles northwest of Tontitown at about 6:27 am.

April 26, 1991 Tornado Outbreak

Story by Karen Hatfield -
NWS Tulsa Meteorologist



"So much was destroyed and damaged ... There was a lot of work to be done. Even then, our town worked together to rebuild. It's never been forgotten. The tornado revisits my memory every time we have a tornado drill ... It's definitely something our town has never forgotten" - Jessica Flegel, a teacher at Oologah-Talala Public Schools.

The night of April 26, 1991, is one that many people across the Plains will never forget. Fifty-five tornadoes affected the region from east Texas to far northern Iowa. Thirty of those tornadoes were considered significant and rated F2 or greater on the Fujita scale. The most damaging tornado of the night moved from south of Wichita, Kansas, across McConnell Air Force Base, and into the community of Andover, Kansas, where over a dozen people were killed by the F5 twister as it moved across the Golden Spur Mobile Home park. Another highly photographed tornado developed near Garber in north central Oklahoma, remained on the ground for 66 miles, crossed Interstate 35 near Billings, and finally lifted west-northwest of Pawhuska. A research team from the University of Oklahoma School of Meteorology

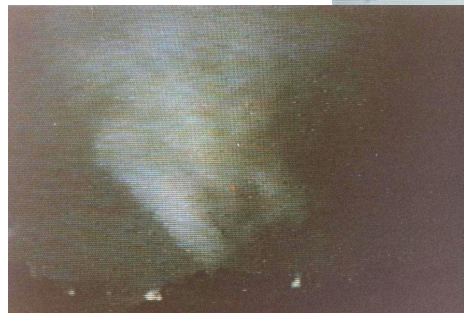
measured peak winds of 288 miles per hour with a portable Doppler radar as the tornado crossed Interstate 35.

Northeast Oklahoma also saw its share of destruction that evening. Six tornadoes impacted areas north and west of Interstate 44, four of which were F2 strength and greater. Three of the twisters rated as F4s. Amazingly, only two people were killed in

totaling the entire bus fleet. Two buses were unaccounted for until they were spotted a half mile from the school by persons participating in then-Governor David Walters' helicopter survey of the damage. The buses had been deposited in a pond. The high school baseball team, returning from a playoff game in Collinsville, had a near miss with the tornado. The tornado hit 10 minutes after everyone had left the school. As a result

Right: Tornado in Oologah, Oklahoma April 26, 1991.

Photo by Jeff Piotrowski



Left: Tornado near Westport, Oklahoma April 26, 1991.

Photo by Jeff Piotrowski

northeast Oklahoma, despite the strength of the tornadoes. The cities of Westport, Skiatook, and Oologah were most affected, with considerable damage near Copan as well. The Oologah-Talala Public Schools complex took a direct hit from an F4 tornado, destroying or heavily damaging most of the school buildings and

of the damage to the school, Friday, April 26th was the last day of school that school year for those attending Oologah-Talala Public Schools. Graduation was held at Claremore High School. The Oologah tornado only remained on the ground for 4 miles, developing a mile west of town and lifting near Lake Oologah. A security camera at the Public Service Company of Oklahoma electric power plant at Lake Oologah captured the 3/4 mile wide tornado as it raked the city.

Westport and western sections of Skiatook were also hit by a tornado of

April 26, 1991 Tornadoes in northeast Oklahoma

Time	Path	Fujita Rating	Length (Miles)	Width (Yards)
6:30 pm - 7:55 pm	3 E Garber to 9 WNW Pawhuska	F4	66	1,000
8:10 pm - 9:27 pm	2 WSW Terilton to 1 NNW Skiatook	F4	32	800
8:27 pm	10 W Pawhuska	F1	0.3	10
9:05 pm	1 SSW Copan to 5 NE Copan	F2	6	100
9:45 pm - 9:53 pm	1 W Oologah to Oologah Lake	F4	4	1,000
10:10 pm - 10:15 pm	1 W Chelsea to 2 N Chelsea	F1	2	30

April 26, 1991 Continues on page 10

April 26, 1991

(Continued from page 9)

tossed it 250 yards.

F4 strength. The tornado developed near Terilton and remained on the ground for 32 miles before lifting in Skiatook. One person was killed in a vehicle as the tornado crossed Highway 412. The twister moved through a Girl Scout camp near the John Zink Ranch. No Girl Scouts were injured, even though the tornado hit the lodge they were staying in. Thirty-two homes were destroyed in a subdivision on the west side of Skiatook, and fifty-four were demolished on the east side of Westport.



For more information on the April 26, 1991, Plains tornado outbreak, including damage photos, radar and satellite imagery, forecast and warning products, and a special perspective from then-Oologah-Talala Public Schools superintendent Dr. Keith Ballard, visit:

www.srh.noaa.gov/tsa/?n=weather-event_1991apr26

Copan was hit by a tornado from the same supercell thunderstorm that produced the long track tornado that moved from near Garber to near Pawhuska. A bait shop and convenience store were destroyed by the F2 twister. One person was killed and one was critically injured when the tornado picked up the car they were waiting in and

Many in the area attributed the relatively small loss of life in northeast Oklahoma to a new and innovative advance warning system that debuted on KOTV in Tulsa that evening. The new system, termed "Pathfinder", extrapolated a thunderstorm's future position based on the current location on the station's Doppler Radar and the speed and direction of movement. The system gave residents an expected time of arrival of the thunderstorm, sometimes up to 30 minutes before the storm affected them. This concept is now a staple of television warning broadcasts across the country.

The weather conditions that resulted in the widespread thunderstorm and tornadic activity were quite common for severe weather situations in this area. A strong upper level disturbance and a fast upper level jet moved into the Plains during the afternoon and evening, and a dryline marched eastward into central Kansas and central Oklahoma by late afternoon and early evening. A warm, moist, and very unstable airmass was in place ahead of the dryline. Supercell thunderstorms developed during the early to mid afternoon hours along the dryline and raced northeastward. A squall line later formed during the mid to late evening hours along a cold front as it pushed through the state. The squall line also moved across northeast Oklahoma.

An Early Test

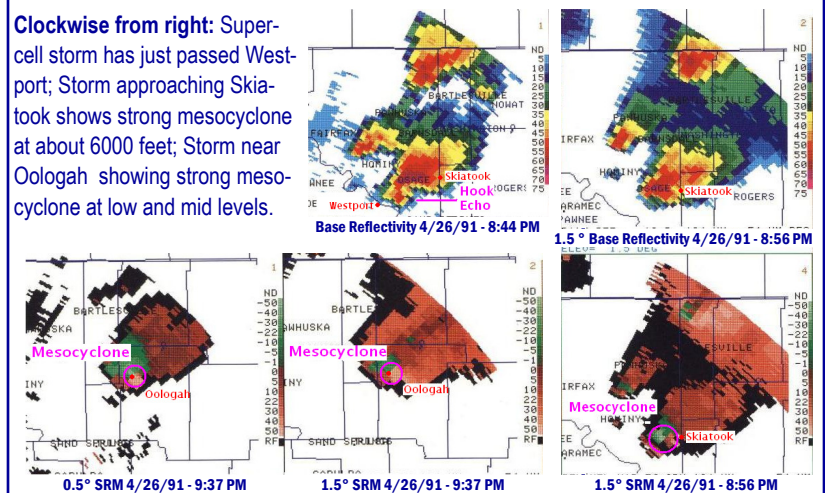
The April 26th, 1991, tornado outbreak occurred in the midst of a period of transition for the National Weather Service as an organization. One important part of the modernization was the development of a nationwide network of Doppler radars, known as the WSR-88Ds. In April of 1991, the Norman, Oklahoma WSR-88D was the only one in service, although it had not yet been cleared for use in everyday operations. WSR-88D provided a unique perspective for storms as far away as southern Kansas and northeast Oklahoma. However, older technology (WSR-74, decommissioned in 1995) remained in use at NWS Tulsa.

The performance of the WSR-88D on April 26th, 1991 led to the following recommendation in the National Weather Service Assessment of the event:

"The NWS should continue to implement the Next Generation Radar (NEXRAD) network across the Nation. This event illustrates the usefulness of the WSR-88D velocity fields and better azimuthal resolution reflectivity data."

Today, there are 159 WSR-88Ds in operation across the country and its territories. Upgrades to the WSR-88D network have continued, allowing forecasters to resolve even

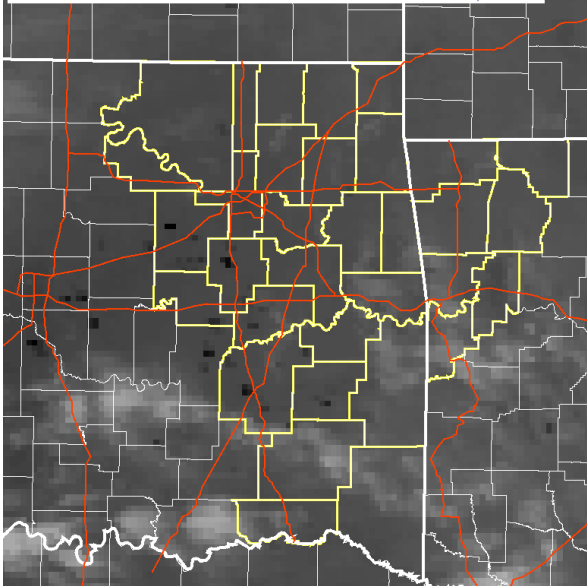
smaller scale and faster evolving details in storms. Further enhancements to the network, including the inclusion of dual polarization technology, are expected to increase detection of certain storm-related phenomena and reduce false alarms.



Busy Fire Season

Warm and windy conditions arriving with the onset of spring, coupled with worsening drought, led to a very active wildfire season over eastern Oklahoma and northwest Arkansas. From January 1 through March 31, 2011, the Oklahoma Forestry Service responded to 635 fires that burned 69,095 acres. The Arkansas Forestry Division reported 872 fires suppressed, burning a total of 4033 acres. These estimates do not include fires responded to by local fire departments.

Satellite Detected Fires - 3:25 PM March 11, 2011



GOES 3.9 micron satellite imagery. The dark areas or "hot spots" in the image correspond to locations of large ongoing fires.

The active fire season continued through early April. According to the Oklahoma Forestry Service, from April 1 through April 5, 51 fires burned a total of 6354 acres in eastern Oklahoma. Some of the larger wildfires occurred in Pittsburg, LeFlore, Okmulgee, Pawnee and Tulsa counties. Blackhawk helicopters equipped with a 660-gallon bucket were dispatched to help with some of these fires.

The heavy rainfall and greening of vegetation across the entire area have greatly reduced the wildfire threat for the time being. By April 30, no county burn bans remained in effect for eastern Oklahoma and northwest Arkansas.

Local News

Recent Severe Weather

April and May of 2011 have seen several outbreaks of severe weather. They will be summarized in the Summer 2011 edition; meanwhile look for details on the NWS Tulsa website.

New HIC

Bill Lawrence has been selected as the Hydrologist-in-Charge of the NWS Arkansas-Red Basin River Forecast Center in Tulsa, OK. Lawrence replaced Billy Olsen, who retired in December.

Lawrence brings a wealth of expertise, experience, and leadership ability to his new position. After launching his NWS career as a meteorologist intern in Little Rock, AR in 1986, he transferred to the Middle Atlantic River Forecast Center as a Hydrologist in 1989 and moved to the ABRFC two years later as the first Hydrometeorological Analysis and Support (HAS) forecaster. Recently, Lawrence has been the Service Coordination Hydrologist at the ABRFC for the last three years.

Congratulations, Bill, from the NWS Tulsa!

NWS Staff Changes

Dave Jankowski is the newest addition to the forecast staff at the NWS Tulsa. Dave replaces Mark Abbas, who recently retired. Dave has been a meteorologist intern in Tulsa since 2007 and previously worked at the WSO in Williston, ND.

And replacing Dave as an intern is Amy Jankowski... Dave's wife. Amy has been an intern at the Central Illinois office.

Congratulations to the Jankowskis!

NWS Tulsa on Facebook

The NWS has begun using Facebook as a supplemental channel to experimentally disseminate information and promote weather awareness activities including outreach and educational efforts.

Fans should not rely on this service as the primary means of receiving alerts/warnings of hazardous weather. NWS alerts/warnings are available on NOAA Weather Radio and our official website.